

CIVIL AERONAUTICS BOARD  
ACCIDENT INVESTIGATION REPORTAdopted: April 21, 1954Released: April 26, 1954UNITED AIR LINES, INC., AND AMERICAN AIRLINES, INC.,  
OVER MICHIGAN CITY, INDIANA - AUGUST 26, 1953The Accident

At about 1917,<sup>1/</sup> August 26, 1953, a United Air Lines Convair 340, N 73133, and an American Airlines Convair 240,<sup>2/</sup> N 94269, both operating in scheduled passenger service, collided at approximately 10,800 feet altitude in the vicinity of Michigan City, Indiana. A hole was torn in the fuselage of each aircraft and instantaneous decompression occurred in both. One passenger of United indicated that he had a neck injury; no other occupant of either aircraft was injured. Both aircraft made emergency landings, United landing at South Bend, Indiana, and American landing at Chicago Midway Airport.

History of the Flights

Evidence indicated that United Air Lines' Flight 314 took off from Runway 22L of Chicago Midway Airport at approximately 1858 on a VFR flight plan to Cleveland, Ohio, via Airways Red 12, Red 55, and Green 3. Cruising altitude was to be 11,000 feet. The crew consisted of Captain L. H. Brubaker, First Officer C. E. Olsen, and Stewardess M. Nix. There were 27 passengers.

Captain Brubaker and First Officer Olsen stated that after takeoff, Captain Brubaker climbed straight ahead and reduction to climb power was made at 400-500 feet altitude. Climb was continued on this heading for about another one-half minute, when a left climbing turn to a southerly heading was made and another left climbing turn to an easterly heading was made at about 2,000 feet. The aircraft was then climbed on a 90-degree course across the lake shore and the southern tip of Lake Michigan. The course was modified to 100 degrees while crossing the lake and at about 9,000 feet in order to proceed toward Goshen, Indiana, with the intention of passing slightly to the south of South Bend. Reaching the top of the haze level at about 9,000 feet, Captain Brubaker shortly thereafter put the aircraft on automatic pilot and continued to climb to 11,300 feet, then descended at approximately 500 feet per minute to establish cruising speed. The descent was discontinued upon reaching 10,800 feet, and the flight leveled off. During part of the descent and the subsequent level flight the first officer was in the process of setting up cruise power. While cruise power was being set by the first officer in level flight, Captain Brubaker caught a glimpse of the other aircraft in front of him an instant before collision and in an effort to pass under American, rolled the pitch control of the automatic pilot forward, almost at the moment the two aircraft made contact. The top of United's fuselage over the right side of the cockpit struck the lower portion of American's fuselage slightly forward of the tail group as United passed under the climbing American aircraft from

1/ All times referred to herein are Central Standard and based on the 24-hour clock.

2/ Hereafter referred to as "United" and "American."

left to right. An attempt was made to declare an emergency, but the radio was inoperative due to collision damage. The United aircraft remained fully controllable, and a normal landing was accomplished at South Bend.

Evidence further indicated that at the time United took off, American Airlines Flight 714 was in run-up position immediately adjacent to Runway 22L. Captain D. W. Davison had filed a VFR flight plan via Airway Red 12 to cruise at 11,000 feet to Willow Run Airport, Ypsilanti, Michigan. In addition to Captain Davison, the crew consisted of First Officer W. M. Haag, Jr., and Stewardess C. M. Justie. There were 24 passengers. Both flights had the same scheduled departure time -- 1845 -- but were slightly late owing to passenger delays.

The precise departure time of American could not be positively established; First Officer Haag (sitting in the right seat) made the takeoff probably within one or two minutes after United's departure. He stated that a left climbing turn was made after climbing straight ahead to an altitude of 1,000 feet, and the turn was discontinued upon reaching a heading of approximately 90 degrees, but climb was continued as the aircraft crossed the southern tip of Lake Michigan. He planned to overhead the South Bend radio range prior to changing course. The aircraft was still climbing when the collision occurred. Instantaneous decompression followed, but the aircraft was fully responsive to controls. An emergency was immediately declared by radio at about 1917 and the aircraft returned to Chicago Midway Airport. Captain Davison took over the controls near Chicago and landed without further incident.

### Investigation

Early in the investigation it was disclosed that the takeoff time reported indicated a sequence of takeoff which was at variance with information given by two air traffic controllers, the pilots, and an American passenger. American's communications office received a message from Flight 714 reporting that they were off the ground at 1857; this message was time-stamped as having been received at 1902. United's communications records reflected that their Flight 314 reported being airborne at 1858 and the message was time-stamped 1900. Thus it appeared, from the content of the messages, that American took off first. On the other hand, one controller stated that he cleared United into takeoff position at 1856, observing the time, cleared United for takeoff at 1857, and changed positions with another controller when United was in its takeoff run. When he cleared United for takeoff, the controller noted there was an American Convair "sitting behind United on the ramp." The second controller took over the local control position at 1857 and estimated that he cleared American for takeoff at 1901. He did not observe the time he took over the position, nor the time he cleared American for takeoff. No other aircraft took off between the two flights involved. Both flights were on VFR flight plans. The tower does not make tape recordings in VFR weather, nor do the controllers keep any log on aircraft movements under VFR conditions. The two controllers were positive that the two flights they cleared were United Flight 314 and American Flight 714.

The United captain testified that as they turned from run-up position onto Runway 22L, he observed an American Convair behind them. When United arrived at run-up position, there were no aircraft ahead of them. Further, he did not recall seeing any other aircraft behind the American Convair. Just after he

applied takeoff power, he overheard an American flight requesting clearance into takeoff position, and some time before leaving tower frequency heard this American flight cleared for takeoff.

The United first officer stated that while they were taxiing to run-up position, he did not hear or see any American Convair take off. No other aircraft preceded them in takeoff. He testified that he saw an American Convair behind them as they moved into takeoff position, and during their takeoff run heard an American Convair cleared into takeoff position. He did not hear this aircraft cleared for takeoff. The first officer stated that he transmitted the message relating to takeoff time about one and one-half minutes after becoming airborne, but he did not recall having looked at the aircraft's clock or his watch at that time.

American's captain testified that they were delayed about eight minutes by another aircraft ahead of them in the "number one spot warming up." He did not know what make aircraft it was nor the company which operated it. He did not see this aircraft take off, as he was engaged in preflight checks. American's time of takeoff was transmitted to company communications by the captain. He testified that the transmission was made about five minutes after becoming airborne, when they were about over the lake shore.

The American first officer saw an aircraft precede them into takeoff position, but he was unable to further identify it. He did not recall if there were any other aircraft waiting behind them.

An American passenger sitting on the left side testified that he saw no other aircraft behind the American flight; however, the one aircraft which preceded them in takeoff was described by him as a United twin-engine aircraft which he tentatively identified at the time as a Convair or Martin, but definitely not a United DC-3.

Company records of both airlines relative to aircraft departures and arrivals were checked by a Board investigator. No American Convair other than the flight involved took off in the immediate pertinent period; United had no other Convair takeoffs; therefore the two aircraft involved could not be confused with another flight operated by either company. It was found that no arriving aircraft was parked in the vicinity of aircraft standing by for takeoff.

The United pilots testified that an indicated air speed of 135-140 knots (155-161 m.p.h.) was maintained from shortly after takeoff until the peak of the climb (11,300 feet). In the descent, speed built up to 170 knots (196 m.p.h.) with a rate of descent of about 500 feet per minute until leveling off at 10,800 feet. First Officer Olsen, seated on the right side, stated that he looked to the right after Captain Brubaker gave a hand signal to reduce to cruise power during the descent. Seeing no other aircraft, First Officer Olsen directed his attention within the cockpit and began setting up cruise power, and was so engaged at the time of the accident. He estimated that the time interval during which he was changing power was approximately 30 to 45 seconds. Indicated air speed remained at about 170 knots.

Captain Brubaker testified that he was alert for other aircraft during the flight, but saw none until an instant before collision. First Officer Olsen testified in the same vein, except that he did not see American in

flight at any time before the accident. Both pilots of American similarly testified that they were vigilant but did not see United at any time before collision. The pilots of both aircraft stated that they were not engaged in duties during climb which diverted their attention from outside the cockpit for more than a few seconds at a time.

First Officer Haag, flying from the right, stated that he climbed American's Convair at 500 feet per minute with an indicated air speed of 180 m.p.h. (156 knots)<sup>3/</sup> to the 10,000-foot level, whereupon air speed was reduced to 170 m.p.h. (148 knots). The aircraft was still in climb when the collision occurred.

Three United passengers in window seats on the right side aft of the wing testified that they saw the other aircraft off to their right shortly before the collision. One of these stated she saw American for an estimated five or six seconds and that it was initially slightly above, ahead, and "only yards away" to the right. Further than this, she was unable to give an estimate of the lateral or vertical separation of the two aircraft. The outlines of American were clearly discernible but she was not sure that she saw any position lights. The two aircraft converged at an acute angle, and American was lost to her sight a few moments before collision. Signed statements of three other United passengers indicated that they saw the tail position lights of American a moment before impact.

An American passenger, an aeronautical engineer, was in the second window seat from the front, left side, and testified that he saw United off to the left at about the 8 o'clock position (left and rear), several hundred feet higher, perhaps a mile away, and apparently in descent. American was continually in climb, to the best of his knowledge. He tentatively identified the other aircraft as a Convair upon first seeing it and thought that it would pass well to the rear under American. He initially saw the right front quarter of the other aircraft, but owing to convergence of their courses, this changed to almost a head-on view just before collision, with United closing on American from the left and rear. He estimated that the longitudinal axes of the two aircraft were inclined toward one another about 10-15 degrees during the period of closure. It also appeared that the other aircraft was in level flight prior to collision. He estimated that he had United in sight for perhaps two minutes; about three to five seconds before the accident, he believed that collision was inevitable. It seemed to him that United's speed was greater before collision.

Of the other American passengers, two indicated that they caught a glimpse of lights or metal of the other aircraft to their left an instant before collision.

The accident occurred during the twilight period about 35 minutes after sunset and 10 minutes after moonrise, corrected for the 11,000-foot level over Michigan City. It was dusk, as civil twilight ended about three minutes before collision, but the western sky was still lighted to a considerable degree.

Neither crew knew that another company had a flight operating at the  
<sup>3/</sup> United's air speed indicators were calibrated in knots; those of American in miles per hour.

same scheduled time, over the same route. The cruising altitude selected by each captain was a coincidence.

As both aircraft were on VFR flight plans, CAA Air Route Traffic Control was not responsible for providing en route separation.

Investigation revealed that the required position lights on both aircraft were in the "flashing" position from time of takeoff. Neither aircraft was equipped with a high-intensity rotating anti-collision light, but both companies were in the process of equipping their fleets with it.<sup>4/</sup>

U. S. Weather Bureau reports reflected that the haze was relatively light and the top of the haze in the Chicago-Michigan City area was between 9,000 and 10,000 feet. The pilots also testified that the haze was light, and that it did not appreciably affect their ability to see several miles. The United pilots stated that the top of the haze was reached at about 9,000 feet, while the American pilots noted that they passed above the haze at about 10,000 feet. Ceiling and visibility were unlimited above the haze.

Occupants of both aircraft were in general agreement that impact was not particularly severe. This was borne out by examination of the relatively moderate structural damage to both aircraft. Damage to each aircraft was examined with the primary view of determining the relative positions of both at the instant of impact.

The right front top section of the cockpit of United's Convair 340 was partially flattened, and the skin was crumpled. The right clear-view cockpit window, located between the right front windshield and the first officer's side window, was "crazed" over its entire area, but the glass remained intact in the frame. Scuff marks on the upper skin of the fuselage were at an angle of approximately 43 degrees, measuring clockwise from the nose and relative to the fuselage centerline. The crushed area extended rearward 32 inches, at which point the top skin began tearing from the aircraft. A strip of top fuselage skin and sections of several stringers several feet long were torn free of the aircraft. As the fuselage skin was ripped, it ruptured outward as a result of instantaneous decompression. The ILS, VHF, AND HF radio antennas were torn off. The left wing skin of the United aircraft had a gash approximately two feet outboard of the landing light and about five inches above the leading edge centerline. A deep gouge was found in the leading edge of one blade of the left propeller as a result of impact with a flying metal

<sup>4/</sup> In order that operators could evaluate more thoroughly this and other systems of aircraft exterior lighting, the Board promulgated Special Civil Air Regulations Nos. SR-361, effective March 1, 1951, SR-390, effective January 1, 1953, and SR-392, effective May 16, 1953. A Notice of Proposed Rule Making was also circulated to the industry on November 10, 1953, which would require installation of anti-collision lights, to be used between sunset and sunrise, on all aircraft over 12,500 pounds maximum certificated gross weight not later than September 30, 1954. A decision on the proposed amendment to pertinent Parts of the Civil Air Regulations will be made at a later date following consideration of all comments.

object. No other propeller or power plant damage was found. Lighting and radio wiring in the cockpit was severed. The cockpit, front cabin, and lavatory doors were torn from their hinges by decompression forces. Sections of the removable aisle flooring were lifted and displaced, but were held in their generally normal position by the floor carpet. Other damage in the cabin area was minor.

Impact damage to the American Convair 240 extended along the lower surface of the fuselage from the forward edge of the left rear service door rearward 154 inches. The hole across the fuselage measured 86 inches at its widest point. Four bell formers were torn, twisted, bent, and compressed upward. Three fuselage formers aft of the skin puncture were bent and broken. The passenger cabin was not damaged. Collision left a scuffed area impregnated with blue paint or lacquer in the general area of the hole in the fuselage. The abrasions made diagonal lines which were consistent in direction; the angular measurement of these lines relative to the aircraft centerline was 116 degrees, measured counterclockwise. The angle of convergence of the two aircraft at the moment of collision was therefore about 21 degrees. The ragged edges of skin were forced outward by decompression.

None of the propellers contacted any airframe structure; damage to both aircraft was caused by contact of the two airframes alone.

Examination of both aircraft and their maintenance records disclosed no evidence that either aircraft was not airworthy at takeoff. The records indicated that the gross weights of the two aircraft were less than the authorized maximums and that the useful loads were properly distributed. The pilots testified that no malfunctions were experienced prior to the accident. Both companies, their aircraft, and the pilots were currently certificated.

Cockpit visibility photographs, showing the field of vision available to each of the four pilots, were taken. A special panoramic camera was so positioned in each of the four instances that its two lenses were at the level of the individual pilot's eyes.

The United captain, from his particular seat position, could see about 90 degrees to the right from dead ahead, at which limit he could see 10 degrees down and 5 degrees up.<sup>5/</sup> The glare shield caused a considerable obstruction to downward and forward vision, varying from a maximum 13 degrees down from dead ahead to a minimum of 5 degrees where a line of sight across the right edge of the glare shield would pass through the first officer's clear-view window. The compass housing also offered a restriction about 10 degrees wide; the top of the housing was about at eye level.

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<sup>5/</sup> The visibility angles given above are approximate, as there are variations at any point due to the shape of the windows and objects which obstruct portions of the panes; further, these angular limits do not give consideration to the restriction offered by the other pilot. These values are restricted to the particular eye level of the individual pilot, and if the body were moved, the above figures would not be valid for the new situation. The attitude of the aircraft also affects the field of vision at any given time; e.g., the downward field of vision is increased when an airplane is diving.

The United first officer, without moving his body, could see to the right about 25 degrees aft of abeam. At the rear sill of his side window, the limits were about 20-25 degrees down and 12 degrees up. His maximum downward visibility from this seat position was 37 degrees, at the ~~mid-point~~ fore and aft of the bottom sill of his side window. His maximum downward angle through the clear-view window was about 30 degrees.

The American captain, from his seat position, would have been able to see about 105 degrees to the left from dead ahead and at the rear sill of the left side window, about 20 degrees up and 20 degrees down. Seventy-five degrees left of dead ahead (left side window), he had a range of 30 degrees either up or down. The range would have been at a minimum when 15 degrees left of dead ahead, the limits there being 25 degrees up and 12 degrees down.

The American first officer ~~could~~ see 95 degrees to the left of dead ahead. At the rear sill of the captain's side window, he would have been able to see upward only about 5 degrees from eye level and 10 degrees downward. Looking through the captain's forward windshield, he would have had a range of 7 to 12 degrees upward, owing to the shape of the windshield, and could have seen downward 6 to 8 degrees. From his seat position, the compass housing was about 8 degrees wide and the top was just below his eye level. He could see about 27 degrees upward and 15 degrees downward when looking straight ahead through his own forward windshield.

The training programs of both companies and the training given to each pilot were examined during the course of the investigation. As a result of this review, the Board has no criticism of the programs or training given to the pilots involved.

### Analysis

Although there is a question as to the exact time each aircraft departed Chicago, evidence indicates that United took off first and American followed a short time later. In considering the evidence regarding the initial lead of United, it is believed that the flights took off within one or two minutes of each other. Therefore at the time American took off, United had an appreciable lead in altitude and total distance traversed, with both proceeding toward South Bend.

American cut down the lead and west of Michigan City, passed to the right of United but at lower altitude. United then closed the gap created by American's passage, since the speed United built up in descent and maintained in the short period of level flight exceeded American's speed. Since United had the greater speed for such a short period of time, the American flight could not have gotten very far ahead.

There are many factors to consider in analyzing this accident, such as visibility in haze, the twilight condition, improved natural light as both aircraft climbed, conspicuity of both in the twilight period during climb, the effectiveness of the aircraft position lights, vigilance of the pilots, cockpit visibility, and relative positions of the two aircraft at various stages of their flights. Considering the amount of separation when at the lower altitudes and in the haze, the Board would hesitate to state that United could have been sighted by American's pilots (and vice versa) during their climb through the haze. However, after careful consideration of the evidence, the

Board must conclude that had the pilots of both aircraft been maintaining the proper lookout, especially after passing above the haze level and when the separation of the two aircraft lessened, one or more of the pilots should have been able to see the other aircraft in sufficient time to alter course before the situation became critical.<sup>6/</sup>

Study of United passenger statements and cockpit visibility photographs indicated that the American captain should have been able to see United before he drew abreast, by looking off to his left, upward, and forward, since United was within his normal forward field of vision. He should also have been able to see United when American was abreast since he, like the United passengers, had a practically unobstructed view to his left. It is also possible that the American first officer could have seen United as they passed, although United could conceivably have been in a blind spot to him owing to the roof of the cockpit. Up to the time American passed, had its pilots seen United, it would not necessarily have caused them any concern or necessitated a radical change in heading since it would not have appeared to them that the aircraft were on converging courses; however, they would have known that another aircraft was in the same area and proceeding in the same general direction.

After American drew ahead, it became increasingly difficult for its pilots to see United. The American first officer, in the right seat, could not have seen it for long, if at all; the American captain would have been able to see United for a time, but would have found it difficult, if not impossible, to see United as the two aircraft converged in the last moments before collision.

At the time American drew abeam of United, the United first officer should have been able to see the other aircraft to his right at slightly lower altitude, had he been exercising proper vigilance. When he scanned the area just before setting up power, American was a little lower, somewhat to the right, and probably slightly ahead; he should have been able to see it at that time; after this his attention was directed within the cockpit.

The United captain seemingly had an opportunity to see American, both during descent and level flight. American was ahead, below, and to the right. The courses were converging and American was climbing. This combination of convergence and climb resulted in American progressively getting in a more difficult position to be seen by the United captain. In addition, no clear line of sight was available to him, as was the case with the American passenger who looked back with an unobstructed view of United to the left, rear, and above, for the captain's seat was adjusted to a low position and the glare shield and forward fuselage structure restricted his view downward and to the right. Therefore, paradoxical as it might seem, American had to be at or near his level before he could, with certainty, have seen the other aircraft in the final period of level flight when the two aircraft were converging in both the vertical and horizontal planes.

Since the collision occurred at dusk there was less natural light available and the two aircraft were not as conspicuous as in full daylight; aircraft lighting was not as effective as it would have been a little later during the hours of darkness; further, cockpits are products of design compromises and blind spots are not completely eliminated. Nevertheless, the circumstances

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<sup>6/</sup> See Civil Air Regulations, Part 60, Sections 60.12, 60.14, 60.15.



of the passage were such in this case that all of the pilots should have been able to see the other aircraft at some time; the American pilots prior to the time they passed ahead, the first officer of United at least when American was abeam and until he set up power and the United captain when American was abeam to slightly ahead.

During VFR flight, pilots alone are responsible, under Civil Air Regulations, for maintaining separation from other aircraft. Therefore, the Board cannot find but that both American and United were responsible, in different degree, for the situation which resulted in the collision, as they apparently did not exercise the highest degree of care.<sup>2/</sup>

It would have been desirable for the companies to have provided a means by which their pilots were advised of flights by different carriers scheduled to operate over the same route, at the same altitude, and at the same time.

For many years the standard method of making aircraft distinguishable under limited visibility conditions or during the hours of darkness had been by use of navigation lights. In the past decade, it has been recognized that conspicuity of aircraft during the hours of darkness could be and has been improved, through regulations promulgated by the Board, to provide greater conspicuity. Experiments in recent years have pointed to the desirability of adding a high-intensity rotating light to the flashing position lights. Evaluation of this light has shown that safety in flight can be materially increased if aircraft are so equipped. At the present time installation of the high-intensity rotating (or anti-collision) light is made by the operator on a voluntary basis. The voluntary program has indicated relatively unsatisfactory progress. Accordingly, a proposed change in Civil Air Regulations is presently under consideration.

This proposed change is but one of the projects under active consideration in the prevention of air collisions. Items such as improved cockpit visibility, the reduction of cockpit duties that tend to distract the attention of pilots from maintaining the necessary lookout to keep clear of other aircraft, the feasibility of aircraft separation at higher altitudes by traffic control, and examination of pilot incident reports, are under active study by the appropriate governmental agencies in collaboration with the aviation industry.

### Findings

On the basis of all available evidence the Board finds that:

1. The companies, both aircraft, and the pilots were currently certificated.
2. Both aircraft were within their maximum permissible gross takeoff weights and the loads were properly distributed.

<sup>2/</sup> In the regulation of air transportation, the Civil Aeronautics Act of 1938, as amended, Title I, Section 2(b) and Title VI, Section 601(b) requires that the highest degree of safety in air transportation be assured. Therefore in carrying out its statutory requirements, the Board has applied the standard that an airline pilot must exercise the highest degree of care to assure the highest degree of safety to the public.

3. Both aircraft were airworthy prior to collision.

4. United Flight 314 and American Flight 714 had the same scheduled departure time, were on VFR flight plans to cruise at 11,000 feet, and were proceeding to their first check point, South Bend, Indiana, when the collision occurred in the vicinity of Michigan City, Indiana, at about 1917.

5. Neither crew knew of the presence of a flight by a different carrier scheduled to operate over the same route, and at the same time.

6. United Flight 314 departed Chicago Midway Airport at approximately 1858, climbed to 11,300 feet, descended to about 10,800 feet, and had been in level flight for 30-45 seconds before collision.

7. American Flight 714 departed Chicago Midway Airport one or two minutes after United and was still in climb at the time of collision.

8. American reduced the distance and altitude lead created by the earlier takeoff of United, and in climb passed to the right of United; United then overtook American since the speed built up in descent and maintained in the short period of level flight exceeded American's speed.

9. One or both of the pilots of each aircraft could have observed the other aircraft while in flight at some time prior to the collision.

10. The United captain caught a glimpse of the other aircraft an instant before collision; none of the other pilots saw the other aircraft.

11. Several passengers in both aircraft saw the other for an appreciable period of time before collision.

12. Visibility in the haze was above minimums specified for VFR flight; above the haze ceiling and visibility were unlimited.

13. It was the responsibility of the pilots, under Civil Air Regulations, to maintain separation from other aircraft.

#### Probable Cause

The Board determines that the primary cause of this accident was the failure of the United crew to observe and avoid the American aircraft while overtaking it on a converging course from the left and rear. However, the American crew demonstrated a lack of alertness in not observing United prior to passing and while abeam.

BY THE CIVIL AERONAUTICS BOARD:

/s/ CHAN GURNEY

/s/ HARMAR D. DENNY

/s/ OSWALD RYAN

/s/ JOSH LEE

/s/ JOSEPH P. ADAMS

## S U P P L E M E N T A L   D A T A

### Investigation and Hearing

The Civil Aeronautics Board was notified of this accident at 1945, August 26, 1953. An investigation was immediately initiated in accordance with the provisions of Section 702 (a)(2) of the Civil Aeronautics Act of 1938, as amended. A public hearing was ordered by the Board and was held in the Del Prado Hotel, Chicago, Illinois, on September 24-26, 1953.

### Air Carriers

United Air Lines, Inc., a Delaware corporation, maintains its principal offices at Chicago, Illinois. The company holds a certificate of convenience and necessity issued by the Civil Aeronautics Board, authorizing the carriage of persons, property, and mail over a number of routes, including the segment between Omaha, Nebraska, and Cleveland, Ohio, which was the route segment over which Flight 314 was operating. United Air Lines, Inc., also holds a valid air carrier operating certificate issued by the Civil Aeronautics Administration for operation over the route involved.

American Airlines, Inc., is a Delaware corporation with its general offices in New York, New York. The company is engaged in the transportation of persons, property, and mail under a currently effective certificate of convenience and necessity issued by the Civil Aeronautics Board, and an air carrier operating certificate issued by the Civil Aeronautics Administration. These certificates authorize operations between various points on Route 7 which include, among others, the following cities: Chicago, Illinois; Detroit, Michigan; and Buffalo, New York. Flight 714 was scheduled to operate into these cities.

### Flight Personnel

#### United Air Lines

Captain Lewis M. Brubaker, age 32, was employed by United Air Lines on June 29, 1945, and was promoted to captain on March 25, 1952. He held a valid airman certificate with currently effective air transport and Convair 340 ratings. Captain Brubaker's total pilot time was 6,262 hours, of which he had served 12:30 hours as captain of the Convair 340. His last physical examination was accomplished on July 22, 1953. Captain Brubaker had a rest period of 50 hours prior to this flight. His last en route proficiency check over this route was accomplished on April 15, 1953.

First Officer Charles E. Olsen, age 28, was employed by United Air Lines on June 19, 1952. He had 735:46 hours pilot time, of which 54:46 hours were as a Convair 340 first officer. Mr. Olsen possessed a valid airman certificate with commercial and instrument ratings, an aircraft and engine mechanic's certificate, and a radio authorization permit. His last physical examination was completed on June 27, 1953. Mr. Olsen had a rest period of 98:43 hours prior to this flight.

Stewardess Marianne Nix completed stewardess training on March 8, 1952.

American Airlines

Captain Dwight W. Davison, age 37, was employed by American Airlines on March 8, 1943. He was the holder of a valid airman certificate with an air transport rating, currently effective physical examination (July 2, 1953), and a Convair 240 rating. His total flight time was 5,420 hours, of which 1,755 were in Convair 240 equipment. Prior to reporting for duty at 1145 on the day of the accident, Captain Davison had a rest period of 18:44 hours. He then flew two trips for a total of 2:16 hours prior to the departure of Flight 714. His last route check over this route was accomplished on August 10, 1953.

First Officer William M. Haag, Jr., age 28, was employed by American Airlines on May 20, 1953. He possessed a valid airman certificate with commercial, instrument, and Convair 240 ratings, and his last physical examination was accomplished on October 27, 1952. Mr. Haag had a total of 3,350 flying hours, of which 1,650 were acquired in Convair 240 equipment. He had the same rest period and flight time just prior to the accident as Captain Davison.

Stewardess Collette M. Justie was employed by American Airlines on June 29, 1951.

The Aircraft

United Air Lines

N 73133, a Convair 340, manufacturer's serial number 70, was manufactured in April 1953, and delivered to United Air Lines on April 28. It was equipped with Pratt & Whitney R-2800-CB16 engines and Hamilton Standard propellers. Total time on the aircraft was 726 hours.

American Airlines

N 94269, a Convair 240, manufacturer's serial number 146, was manufactured in February 1949, and delivered to American Airlines March 4, 1949. It was equipped with Pratt & Whitney R-2800-83AM1A engines and Hamilton Standard propellers. Total time on the aircraft was 9,335 hours.